

What is claimed is

1. A method for selectively enabling signal interference cancellation, comprising:

identifying a plurality of signal paths;  
for a set of said identified signal paths, determining an observed signal strength;  
5 identifying at least one of said signal paths as a potential interferer based at least  
in part on the observed signal strength; and  
creating at least a first interference cancelled signal stream.

2. The method of Claim 1, further comprising:

determining whether providing said at least a first interference cancelled signal  
stream to at least a first signal processor will improve a signal to noise ratio of at least a  
first signal path assigned to said at least a first signal processor; and  
5 in response to determining that said at least a first interference cancelled signal  
stream will improve a signal to noise ratio of said signal path at least a first signal stream  
assigned to said at least a first signal processor, providing said at least a first interference  
cancelled signal stream to said at least a first signal processor.

3. The method of Claim 1, further comprising:

determining whether providing said at least a first interference cancelled signal  
stream to said at least a first signal processor will improve a signal to noise ratio of at  
least a first signal path assigned to said at least a first signal processor;  
5 in response to determining that said at least a first interference cancelled signal  
stream will not improve a signal to noise ratio of said at least a first signal path assigned  
to said at least a first signal processor, discontinuing said creating at least a first  
interference cancelled signal stream.

4. The method of Claim 3, further comprising:  
providing a non-interference cancelled signal stream to said at least a first signal processor.
5. The method of Claim 1, wherein said set of identified signal paths comprises a set of assigned signal paths.
6. The method of Claim 5, wherein said set of assigned signal paths is obtained from a demodulation path list.
7. The method of Claim 1, wherein said identifying a plurality of potential interferers comprises identifying a first number of signal paths having at least a first signal strength.
8. The method of Claim 1, further comprising:  
listing said potential interferers in a candidate to cancel list.
9. The method of Claim 8, further comprising updating a to cancel list by replacing a signal path in said to cancel list having a signal strength that is less than a signal strength of one of said potential interferers in said candidate to cancel list with said one of said potential interferers.
10. The method of Claim 1, further comprising updating a channel determination list by entering signal paths from said to cancel list in said channel determination list.
11. The method of Claim 1, further comprising:

storing an identity of said plurality of signal paths in said channel to create a survey path list;

providing an interference canceled signal stream to a searcher element; and

updating said survey path list.

12. The method of Claim 1, further comprising:

storing an identity of said plurality of signal paths to create a survey path list;

providing an interference canceled signal stream to a correlator element; and

5 updating said survey path list.

13. The method of Claim 1, further comprising:

storing an identity of said at least a first interference cancelled signal.

14. A method for selectively enabling signal interference cancellation, comprising:

determining whether providing at least a first interference cancelled signal stream to at least a first signal processor will improve a signal to noise ratio of a signal path  
5 assigned to said at least a first signal processor; and

in response to determining that said at least a first interference cancelled signal stream will improve a signal to noise ratio of said at least a first signal processor, providing said at least a first interference cancelled signal stream to said at least a first signal processor.

15. The method of Claim 14, further comprising:

identifying a plurality of signal paths;

for a set of said identified signal paths, determining an observed signal strength;

and

5 identifying at least one of said signal paths as a potential interferer.

16. The method of Claim 14, further comprising:

creating said at least a first interference cancelled signal stream.

17. The method of Claim 14, further comprising:

in response to determining that said at least a first interference cancelled signal stream will not improve a signal to noise ratio of another of said signal paths assigned to said at least a first signal processor, discontinuing said providing said at least a first  
5 interference cancelled signal stream to said at least a first signal processor.

18. The method of Claim 15, further comprising:

identifying a plurality of said signal paths as potential interferers, wherein said identifying a plurality of potential interferers comprises identifying a first number of signal paths having at least a first signal strength.

19. An apparatus for canceling interfering signal paths, comprising:  
a plurality of demodulation fingers;  
a cancellation controller operable to selectively provide, in a first mode, an  
interference cancelled signal stream and, in a second mode, a non-interference cancelled  
5 signal stream to each of said plurality of demodulation fingers.

20. The apparatus of Claim 19, further comprising:  
a searcher finger, wherein said cancellation controller selectively provides one of  
an interference cancelled signal stream and a non-interference cancelled signal stream to  
said searcher finger.

21. The apparatus of Claim 19, wherein said cancellation controller  
comprises:  
a channel determination module operable to provide at least one replica of an  
interfering signal path; and  
5 a signal cancellation module operable to remove said at least one replica of an  
interfering signal path from another signal stream.

22. The apparatus of Claim 21, wherein said cancellation controller further  
comprises:  
a plurality of channel determination modules each of which is operable to provide  
a replica of an interfering signal path; and  
5 a plurality of signal cancellation modules each operable to remove at least one  
replica of an interfering signal path from another signal stream.

23. The apparatus of Claim 22, wherein a number of demodulation fingers in said plurality of demodulation fingers is greater than a number of channel determination modules in said plurality of channel determination modules.

24. The apparatus of Claim 22, wherein a first number of demodulation fingers are included in said plurality of demodulation fingers, and wherein a like number of channel determination modules are included in said plurality of channel determination modules and a like number of signal cancellation modules are included in said plurality  
5 of signal cancellation modules.

25. The apparatus of Claim 19, wherein each of said demodulation fingers comprises a tracking module and a demodulation module.

26. A method for selecting a signal interference cancellation scheme, comprising:

populating a to cancel list with an identity of at least a first signal path that has been identified as an interfering signal path; and

5 establishing a connection between a demodulating finger and one of a raw signal stream and an interference cancelled signal stream based on an entry in said to cancel list.

27. The method of Claim 26, further comprising:

populating a candidate to cancel list comprising an identity of a signal path that is a potential interfering signal path;

5 canceling said potential interfering signal path from at least one other signal stream; and

determining whether a parameter associated with reception of said at least one other signal path improved as a result of said canceling of said potential interfering signal path.

28. The method of Claim 27, wherein in response to determining that a parameter associated with reception of said at least one other signal path did not improve as a result of said canceling of potential interfering signal path, said establishing a connection comprises establishing a connection between said demodulating finger and a  
5 raw signal stream.

29. The method of Claim 27, wherein in response to determining that a parameter associated with reception of said at least one other signal path did improve as a result of said canceling of potential interfering signal path, said establishing a connection

comprises establishing a connection between said demodulating finger and an interference cancelled signal stream.

30. The method of Claim 27, wherein said populating a candidate to cancel list comprises populating said candidate to cancel list with identities of a number of signals that are potential interfering signals.

31. The method of Claim 27, wherein said at least a first potential interfering signal path has a signal strength that is greater than a predetermined threshold.

32. The method of Claim 27, wherein said potential at least a first potential interfering signal path has a signal strength greater than another signal by at least a first predetermined amount.

33. The method of Claim 26, wherein a raw signal stream is provided to a first demodulating finger and an interference cancelled signal stream is provided to a second demodulating finger.

34. The method of Claim 26, further comprising:  
providing a raw signal stream to a searcher finger;  
creating a survey path list containing at least a first path identified in said raw signal stream by said searcher finger;  
5 providing an interference cancelled signal stream to said searcher finger; and  
updating said survey path list to include at least a second path identified in said interference cancelled signal stream by said searcher finger.

35. The method of Claim 26, further comprising:

updating a signal feed list, wherein said signal feed list identifies for each demodulating finger a provided signal.

36. The method of Claim 26, further comprising:

producing in said channel determination module an estimate of a signal path associated with a first one of said demodulating fingers;

5 creating a first interference cancelled signal stream by combining said estimate of said provided signal path with at least one of said raw signal stream and a second interference cancelled signal stream, wherein said first interference cancelled signal stream is provided to a second of said demodulating fingers.

37. The method of Claim 36, wherein said combining of said estimate of said provided signal path with at least one of said raw signal stream and a second interference cancelled signal stream comprises subtracting a replica of said provided signal path from said at least one of said raw signal stream and said second interference cancelled signal stream.

38. The method of Claim 36, wherein said combining of said estimate of said provided signal path with at least one of said raw signal stream and a second interference cancelled signal stream comprises projecting said raw signal stream and said second interference cancelled signal stream into subspace orthogonal to said provided signal path.

39. A method for providing an interference cancelled signal stream, comprising:

providing a first signal stream from which at least a first potential interfering signal path has been cancelled;

5 determining a strength of at least a first desired signal path detected in said first signal stream;

for each desired signal path for which a reception parameter associated with said desired signal path detected in said first signal stream has improved as a result of said providing said first signal stream, identifying said desired signal path in a first list,

10 wherein said desired signal path is associated with said first signal stream.

40. The method of Claim 39, wherein said first list comprises a cancel path list.

41. The method of Claim 39, wherein said reception parameter comprises a measurement of signal strength.

42. The method of Claim 40, wherein said measurement of signal strength comprises a signal to noise ratio.

43. The method of Claim 39, wherein said reception parameter has improved if it increases by at least a first amount as compared to a previously measured parameter for said desired signal path.

44. The method of Claim 39, further comprising:  
demodulating said first signal stream to obtain a first desired signal path.

45. The method of Claim 39, further comprising:

a plurality of desired signal paths, wherein a strength of each of at least some of said desired signal paths increases and wherein each of said at least some of said desired signal paths is identified in said first list;

5 demodulating said first signal stream to obtain a first desired signal path; and  
demodulating a second signal stream to obtain a second desired signal path.

46. The method of Claim 39, further comprising:

providing a second signal stream from which at least a second potential interfering signal path has been cancelled;

5 determining a strength of said at least a first desired signal path detected in said  
second signal stream; and

for each desired signal path for which a reception parameter associated with said desired signal path detected in said second signal stream has improved as a result of said providing said second signal stream, identifying said desired signal path in said first list, wherein said desired signal path is associated with said second signal stream.

47. The method of Claim 39, further comprising:

demodulating said first signal stream to obtain said first desired signal.

48. The method of Claim 39, further comprising:

providing a second signal stream from which at least a second potential interfering signal path has been cancelled;

for each desired signal path for which a reception parameter associated with said desired signal path detected in said second signal stream has improved as a result of said providing said second stream, comparing said improvement with said improvement as a

result of said providing said first signal stream and selecting said signal stream providing a greatest improvement.

49. The method of Claim 39, further comprising:

providing a raw signal stream;

for each desired signal path for which a reception parameter associated with said desired signal path detected in said raw signal stream has improved as a result of said providing said raw signal stream, comparing said improvement with said improvement as a result of said providing said first signal stream and selecting said signal stream providing a greatest improvement.

50. A method for selecting signal paths for cancellation from a signal stream provided to a demodulating processor, comprising:

in a first mode:

determining that cancellation of a potentially interfering signal path does not  
5 increase a signal strength of a desired signal path;

providing a raw signal stream to a first demodulating processor.

in a second mode:

determining that cancellation of a potentially interfering signal path does  
increase a signal strength of a desired signal path; and

10 providing a signal stream from which said potentially interfering signal  
stream has been removed to said first demodulating processor.

51. The method of Claim 50, further comprising:

providing said raw signal stream to a second demodulating processor, wherein  
said potentially interfering signal stream is demodulated by said second demodulating  
processor.

52. The method of Claim 50, wherein said determining that cancellation of a  
potentially interfering signal path does not increase a signal strength of a desired signal  
path comprises determining that said signal strength has not increased by at least a  
selected threshold amount.

53. The method of Claim 50, wherein said determining that cancellation of a  
potentially interfering signal path does increase a signal strength of a desired signal path  
comprises determining that said signal strength has increased by at least a selected  
threshold amount.

54. The method of Claim 50, wherein said signal strength comprises a signal to noise ratio.

55. The method of Claim 50, wherein an estimate of said signal strength is obtained by monitoring an amplitude of a plurality of channels in said signal.

56. The method of Claim 50, further comprising:  
determining an optimal signal stream for a demodulating finger assigned to demodulate a signal path within said signal stream.

57. A set of data structures for use in identifying a potentially interfering signal path, comprising:

a demodulating finger identifier;

a signal path assigned to each demodulating finger identifier; and

a signal strength associated with each signal path.

58. The data structure of Claim 57, further comprising:

a sector associated with each signal path.

59. A set of data structures for use in identifying a signal path to be removed from a signal stream, comprising:

- a demodulating finger identifier; and
- a signal path assigned to each demodulating finger identifier, wherein said signal

5 path has been identified as being a potential interfering signal path.

60. A set of data structures for use in controlling a signal provided to a demodulating finger, comprising:

a demodulating finger identifier;

for each demodulating finger identifier an assigned canceller;

5 for each demodulating finger identifier, a path cancelled from a signal stream provided to the corresponding demodulating finger.

61. A method for selectively enabling signal interference cancellation, comprising:

identifying at least one signal path in a set of signal paths;

for the at least one signal, determining an observed signal strength; and

5 identifying at least one of said signal paths as a potential interferer based at least in part on the observed signal strength.

62. The method of Claim 61, further comprising:

producing an interference cancelled signal stream, wherein said at least one signal path identified as a potential interferer is cancelled from said signal producing an interference cancelled stream.

63. The method of Claim 62, further comprising:

correlating said interference cancelled signal stream with a reference signal; and

in response to a strength of a desired signal having a strength that is not improved as a result of using said interference cancelled signal, providing a signal including said at  
5 least one signal path to a demodulation finger assigned to demodulate said desired signal.

64. The method of Claim 62, further comprising:

correlating said interference cancelled signal stream with a reference signal; and

in response to a strength of a desired signal path increasing as a result of creating said interference cancelled signal stream, providing said interference cancelled signal  
5 stream to a demodulating finger assigned to demodulate said desired signal path.

65. A method for selectively enabling signal interference cancellation, comprising:

providing a set of signal paths comprising at least one desired signal path;

identifying at least one signal path in the set of signal paths as a potential

5 interferer with the desired signal path;

determining whether removing the at least one signal path in the set of signal paths will improve a signal to noise ratio (SNR) of the desired signal path by at least a selected threshold; and

when the SNR of the desired signal path is improved by at least the selected  
10 threshold, removing the at least one signal from the signal stream to form an interference canceled signal stream.

66. The method of Claim 65, further comprising:

when the SNR of the desired signal path is not improved by at least the selected threshold amount, not removing the at least one signal path from the signal stream.

67. The method of Claim 65, wherein said determining whether removing the at least one signal path in the set of signal paths will improve a SNR of the desired signal path comprises correlating a signal having the at least one signal path removed to a

5 reference signal.

68. The method of Claim 65, further comprising:

feeding said interference canceled signal stream to a demodulating finger.

69. A method for selecting a signal path for interference cancellation, comprising:

comparing a candidate to cancel list with a to cancel list, wherein each of the candidate to cancel list and to cancel list comprise at least a finger identifier and a signal  
5 identifier of an interfering signal path;

replacing any entry on the to cancel list with each entry in the candidate to cancel list that is not on the to cancel list; and

updating a signal strength of each entry on both the to cancel and candidate to cancel lists with a signal strength on the candidate to cancel list.

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70. The method of Claim 69, further comprising:

producing at least a first signal stream from which an interfering signal path included in said to cancel list has been cancelled;

determining whether a signal strength of a desired signal path has improved as a  
5 result of canceling said interfering signal.

71. The method of Claim 70, further comprising:

in response to determining that said signal strength of a desired signal path has improved as a result of canceling said interfering signal path, providing said at least a first signal stream to a demodulating finger.

72. The method of Claim 70, further comprising:

in response to determining that said signal strength of a desired signal path has not improved as a result of canceling said interfering signal stream, providing other than said at least a first signal stream to a demodulating finger.

73. A method for selecting a signal path for interference cancellation, comprising:

identifying at least one potentially interfering signal path;

5 searching an interference cancelled signal stream, from which the potentially interfering signal path has been removed, for each PN offset having a corresponding signal path possessing at least one of (a) a strength above a selected threshold and (b) a signal-to-noise improvement above a selected threshold; and

providing said interference cancelled signal stream to each demodulating finger assigned to each PN offset having at least one of (a) and (b).

74. The method of Claim 73, further comprising:

providing a raw signal stream to each demodulating finger assigned to each PN offset not having at least one of (a) and (b).

75. A method for performing interference cancellation, comprising:  
providing a plurality of fingers, each finger corresponding to a unique signal path;  
providing a plurality of differing signal streams, at least some of which are  
interference cancelled;

5 for each finger, determining which of the plurality of differing signal streams  
provides a strongest desired signal path; and  
directing the appropriate signal stream to each finger.

76. The method of Claim 75, each signal path corresponding to a unique PN  
offset.

77. A communications apparatus comprising:  
means for receiving a raw signal stream;  
means for demodulating a plurality of signal paths included in said raw signal  
5 stream;  
means for canceling at least a first of said signal paths from said raw signal stream  
to form at least a first interference cancelled signal stream; and  
means for selectively providing one of said raw signal stream and said  
interference cancelled signal stream to said means for demodulating.

78. The apparatus of Claim 77, wherein said means for selectively providing  
provides said interference cancelled signal stream to said means for demodulating in  
response to a determination that a strength of at least a second of said signal paths within  
said interference cancelled signal stream is greater than in said raw signal stream..

79. The apparatus of Claim 77, wherein said means for selectively providing  
provides said raw signal stream to said means for demodulating in response to a  
determination that a strength of at least a second of said signal paths within said raw  
signal stream is greater than in said interference cancelled stream.

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